

AEWA EUROPEAN GOOSE MANAGEMENT PLATFORM



**WORKSHOP FOR THE REVISION OF THE INTERNATIONAL
SINGLE SPECIES MANAGEMENT PLAN
FOR THE SVALBARD POPULATION OF THE
PINK-FOOTED GOOSE**

8-9 October, Levanger, Norway



**EVALUATION REPORT FOR THE PINK-FOOTED GOOSE INTERNATIONAL
SINGLE SPECIES MANAGEMENT PLAN**

AEWA European Goose Management Platform

**EVALUATION OF THE AEWA INTERNATIONAL SINGLE SPECIES
MANAGEMENT PLAN FOR THE SVALBARD POPULATION OF THE PINK-
FOOTED GOOSE (*ANSER BRACHYRHYNCHUS*)**

RESULTS ACHIEVED AND IMPLEMENTATION PERFORMANCE

EVALUATION REPORT

EGMP Technical Report No. XX

**Prepared by the Pink-footed Goose Task Force of the AEWA European Goose
Management Platform**

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Table of Contents

1. Executive summary	5
2. Glossary and acronyms/initialisms.....	5
3. Introduction	6
3.1. Development of the Plan.....	6
3.2. Key concepts and processes provided for in the Plan.....	6
3.3. Implementation structures (e.g. Working Group, Task Forces under WG, coordination, etc)	7
3.4. Goal, Purpose and Objectives of the Plan.....	7
3.5. Plan Evaluation	8
4. Two-step evaluation	8
4.1. Step 1	9
4.2. Step 2	10
5. References.....	27

1. Executive summary

The AEWA International Single Species Management Plan for the Svalbard Pink-footed Goose (PfG ISSMP) expires in 2025. This report evaluates the results and performance of the ISSMP and makes recommendations regarding the Plan's future. The compilation of data for this evaluation was undertaken by members of the European Goose Management Platform (EGMP) Pink-footed Goose Task Force. A draft of the evaluation was presented for comment at the 9th meeting of the European Goose Management International Working Group (EGM IWG9), after which it was further developed and refined. The refined version was consulted with the AEWA Technical Committee, which approved the report and its recommendations for submission to the Standing Committee. The Standing Committee approved the report and its recommendations in September 2024.

The ISSMP has achieved most of the planned results, particularly results given essential and high priority. However, it is important to maintain and adjust the adaptive management of the population for several reasons: (1) A continuation of the adaptive harvest management (AHM) programme is important to ensure that a stable population can be maintained in order to maintain agricultural conflicts to an acceptable level and to avoid potential negative effects on Arctic tundra ecosystems. (2) The AHM managed to stabilise the population around 80,000 individuals (in spring) but did not manage to reach the population target of 60,000 set out in the ISSMP. It is needed to reconsider the target (following agreement on Favourable Reference Values) and to reflect on additional and/or alternative actions to reach it. (3) The effects of goose grazing on tundra vegetation may change in light of observed and anticipated rapid warming of the Arctic; and (4) The population has rapidly and unexpectedly expanded its breeding range to Novaya Zemlya in north Russia and its non-breeding range to include Finland and Sweden, partly based on an emigration from the traditional flyway. This is likely to continue in the coming decade, with yet unknown effects on the overall population size and the biodiversity and human-related interests. To manage this situation, a dynamic and adaptive framework is required depending on continued monitoring.

The conclusion is that there is a need to continue with the implementation of the plan, but it requires a revision. It is recommended to proceed with a full revision including goal, objectives and framework for action.

2. Glossary and acronyms/initialisms

AHM: Adaptive Harvest Management

EGM IWG: European Goose Management International Working Group

EGMP: The AEWA European Goose Management Platform

FRVs: Favourable Reference Values

ISSMP: International Single Species Management Plan

MOP: Meeting of the Parties to AEWA

MU: Management Unit

PfG: Pink-footed Goose

3. Introduction

- **Development of the Plan**

Paragraph 4.3.4 of the Action Plan in Annex 3 to the African-Eurasian Migratory Waterbird Agreement (AEWA) provides that Parties to the Agreement “shall cooperate with a view to developing single species management plans for populations which cause significant damage, in particular to crops and fisheries”. In addition, target 2.4 of AEWA’s Strategic Plan for 2019-2027 aimed for adaptive harvest management regimes to be in place and effectively implemented at flyway level within the framework of Species Action or Management Plans for, *inter alia*, populations which cause significant conflicts with certain human economic activities. Its predecessor (the AEWA Strategic Plan for 2009-2017) similarly aimed to ensure the adaptive management of quarry populations at international scale. The Svalbard population of the Pink-footed Goose (*Anser brachyrhynchus*) was selected as the first test case for an AEWA International Single Species Management Plan to be developed throughout the population’s flyway range by 2012 (Norway, Denmark, the Netherlands and Belgium). Numbers of the Svalbard-breeding population of Pink-footed Goose had increased considerably over the past decades, from c. 15,000 in the 1960s and reaching an estimated population size of 69,000 individuals in 2010. The growth of the population is a conservation success, yet its increasing population size has progressively brought them into conflict with agricultural interests as well as having other environmental and social implications. Several key management issues were identified: (i) the potential for an escalation in agricultural conflicts, particularly in Norway, (ii) concern about degradation of vulnerable tundra vegetation in Svalbard due to increasing goose grazing intensities and (iii) risks of crippling of geese due to shotgun shooting.

The initial stakeholder workshop was held in November 2010, drafts were presented to experts in August 2011, to range states and the AEWA Technical Committee in October 2011, and to the AEWA Standing Committee in November 2011, and the final draft was adopted by the 5th Meeting of the Parties to AEWA (MOP5), in May 2012. An implementation inception workshop was held in August 2012. The revision of the plan was planned for 2022; however, due to Covid pandemic restrictions the plan’s validity was extended by AEWA MOP8 with a view to a revised version being brought to AEWA MOP9 for adoption in 2025. Initial range states included Norway, Denmark, The Netherlands and Belgium but due to a recent expansion of the range into Sweden and Finland, these countries became observers to the process.

- **Key concepts and processes provided for in the Plan**

The ISSMP for the Svalbard population of the Pink-footed goose constitutes the first AEWA (and European) adaptive flyway management plan implemented for a waterbird population. It builds on a participatory structured decision-making framework with goals, management objectives, alternative actions, monitoring and iterative evaluation of implemented actions. The ISSMP introduced for the first time a population target agreed among range states and key stakeholders. The target reflected a provision for safeguarding the population against risk of decline as well as an upper tolerance level in terms of socioeconomic interests and environmental risk. Since it was intended to initially reduce the population and subsequently maintain it at the population target by recreational harvest, the ISSMP had a focus on developing an adaptive harvest management framework. At the time the plan was developed, there was no precedent for setting Favourable Reference Values (FRVs) in the context of AEWA implementation and the AEWA MOP had not yet adopted a Format and Guidelines for ISSMPs which called for the identification of FRVs in all future plans. The PfG ISSMP therefore does not identify FRVs. However, in the population target is embedded an expression of a population size with minimal

risk of extinction even under highly variable levels of harvest, and the plan's objectives include maintenance of range and ecological integrity (i.e. habitat).

- **Implementation structures (e.g. Working Group, Task Forces under WG, coordination, etc)**

During 2012-2015, the ISSMP implementation process was coordinated by the AEWA Pink-footed Goose International Working Group (AEWA PfG IWG). The AEWA PfG IWG was coordinated by Aarhus University under the supervision of the AEWA Secretariat and it also acted as data centre compiling monitoring data and undertaking the annual population assessments including proposals for the optimal harvest strategy. Coordinated field censuses of the population size (spring and autumn) and juvenile production (autumn) have been carried out annually in each range state and the monitoring schemes have been adjusted in a dynamic process to capture changes in distribution and behaviour of the geese. Range states and observers constituting the AEWA PfG IWG met annually to monitor the progress of the plan and to recommend management decisions. Since 2016, the plan has been included under the AEWA European Goose Management Platform (EGMP). A Pink-footed Goose Task Force has been established under the EGMP and makes recommendations annually to the European Goose Management International Working Group (EGM IWG). In most range states, national working groups have been established to support the implementation of the plan.

- **Goal, Purpose and Objectives of the Plan**

The initial version of the goal and objectives were described in the ISSMP (Madsen & Williams 2012) but were specified in a later version (Madsen et al. 2017).

The goal of the ISSMP is to maintain the favourable conservation status of the Svalbard Pink-footed Goose population at flyway level while taking into account biodiversity, economic and recreational interests.

To achieve this goal the following set of **objectives** has been agreed, in consultation with national authorities and key stakeholders:

- I. Maintain population range and ecological integrity.
- II. Minimise agricultural conflicts.
- III. Maintain sustainable and stable population.
- IV. Avoid increase in tundra vegetation degradation in the breeding range.
- V. Allow for recreational use that does not jeopardize the population or social acceptance (reduce crippling due to hunting).

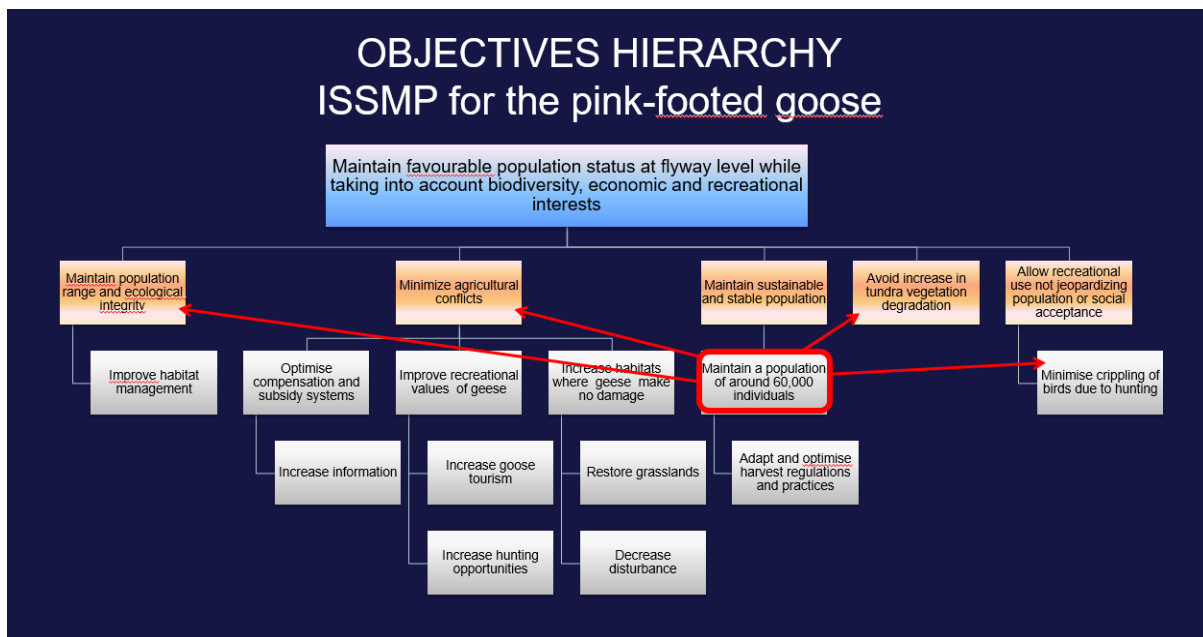


Figure 1. Objectives Hierarchy for the Pink-footed Goose ISSMP. Arrows going out from the means objective 'Maintain a population target of around 60, 000 individuals' indicate that the target setting has implications for all of the objectives defined in the plan (from Madsen et al. 2017).

- **Plan Evaluation**

This evaluation has endeavoured to follow the report template and guidance for the Evaluation of AEWAs international Single and Multi-species Action and Management Plans (agreed by the AEWAs Technical Committee, September 2023) as closely as possible. However, when the ISSMP for the Svalbard population of the Pink-footed Goose was compiled and later implemented, there was no defined format for AEWAs ISSMPs, nor for evaluation criteria. Hence, indicators to evaluate results and implementation performance were rather vague (see Madsen & Williams 2012, Table 8). Therefore, the results and performance cannot *sensu stricto* be quantified in the way recommended by the guidelines. The guidance itself recognises that the evaluation approach will require a degree of customization in such instances.

The compilation of data for this evaluation report was undertaken by members of the EGMP Pink-footed Goose Task Force. A draft of the evaluation was presented for comment at the 9th meeting of the European Goose Management International Working Group (EGM IWG9) in June 2024, after which it was further developed and refined. The refined version was consulted with the AEWAs Technical Committee, which approved the report and its recommendations for submission to the Standing Committee. The Standing Committee approved the report and its recommendations in September 2024.

4. Two-step evaluation

The two-step evaluation follows the decision tree for the retirement, extension, and revision of AEWAs species action and management plans (see [Doc. AEWAs/MOP 8.22](#)).

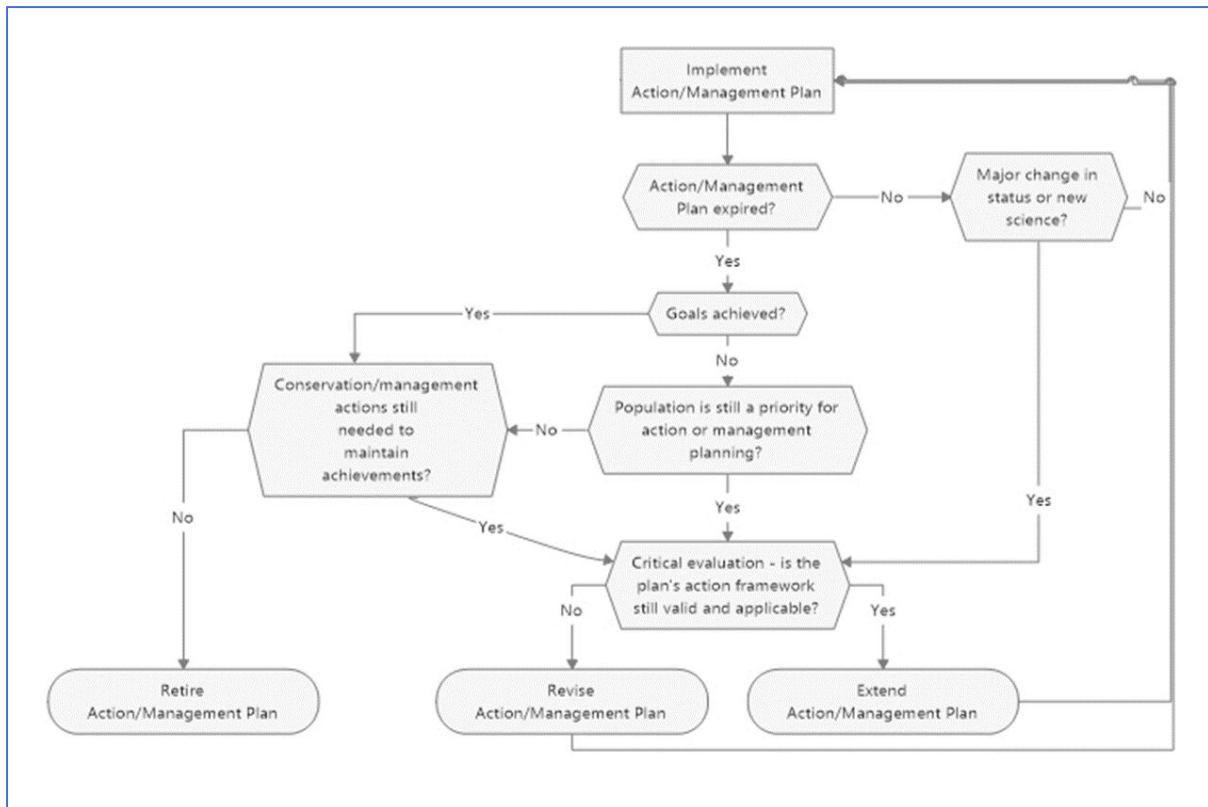


Figure 2. Procedure for the retirement, extension, and revision of AEWA species action and management plans (from Doc. AEWA/MOP 8.22).

Step 1

I. Have the goal and purpose been achieved?

The Pfg ISSMP articulated a goal and objectives, not a purpose. As noted above, the Pfg ISSMP did not define FRVs or other indicators for evaluating achievement of the goal. However, as is explained in Step 2 of this evaluation, the objectives have been achieved: (1) the range has been maintained and even expanded, (2) the agricultural conflicts have subsided, (3) the population has stabilised (yet, above the population target), primarily as a result of increased harvest levels in agreement with the implemented adaptive harvest management framework, (4) the extent and intensity of goose grazing effects on tundra vegetation in Svalbard has been slowed down and, (5) crippling due to hunting has decreased despite increasing harvest rate which is ascribed to a change in hunting practises, awareness raising and practical courses in effective goose shooting. The existence of the plan itself and communication have also been an important alleviating issue in the farmers' communities.

II. Is the population / species still considered by the AEWA Technical Committee a priority for action or management (with recovery objectives) planning?

Since the population is subject to a management plan with a population control objective (rather than a recovery objective), the decision on prioritisation is a prerogative of the Range States rather than the AEWA Technical Committee. At the 9th meeting of the EGM IWG (Tromsø, Norway, June 2024), the IWG took note of the preliminary ISSMP evaluation report and confirmed that the Pink-footed Goose remains a priority for management planning and

implementation. This confirmation is included in the Decisions that were adopted at the meeting (see [Decision Table – EGM IWG9](#)).

III. Do the Range States participating in the implementation of the management plan consider the necessity of continuing concerted actions to address the issue of damage to crops or fisheries?

The objectives of the ISSMP include reducing the agricultural conflict as well as reducing threats to Arctic ecosystems. The maintenance of a stable population at current levels has been a key concerted action to achieve this and has unanimously been backed by the Range States. Updates have been reported and discussed at regular PfG Task Force meetings and annual meetings of the EGM IWG. As noted above, the EGM IWG recently confirmed that the Pink-footed Goose remains a priority for management planning and implementation.

IV. Are conservation or management actions still needed to maintain achievements?

Continued implementation of management actions is needed, as follows:

- 1) the ISSMP is based on an adaptive management framework. A continuation of the adaptive harvest management programme is important to ensure that a stable population can be maintained to maintain agricultural conflicts to an acceptable level and to avoid potential negative effects on Arctic tundra ecosystems,
- 2) AHM managed to stabilise the population but did not manage to reach the population target set out in the ISSMP. It is needed to reflect on the target and on additional and/or alternative actions to reach it,
- 3) the effects of goose grazing on tundra vegetation may change in light of observed and anticipated rapid warming of the Arctic, and
- 4) the population has rapidly and unexpectedly expanded its breeding range to Novaya Zemlya in north Russia and its non-breeding range to include Finland and Sweden, partly based on an emigration from the traditional flyway. This is likely to continue in the coming decade, with yet unknown effects on the overall population size and the biodiversity and human-related interests. To manage this situation, a dynamic and adaptive framework is required.

V. Recommendations for the future of the Plan

It is recommended to continue with the implementation of the ISSMP for the Svalbard population of the Pink-footed Goose.

Step 2

Is the Plan's action framework still valid?

I. Are there new insights, biological or other background information, emerging issues or threats?

Yes. The population has naturally expanded its range to include breeding in Novaya Zemlya, north Russia and has established relevant staging and wintering areas in Finland, Sweden and eastern Denmark (in Poland and Germany as well). The new group has grown from a few hundred birds to >4,000 birds within the last 15 years, and part of the growth has been due to individuals shifting from the traditional flyway to the new range (Madsen et al. 2023). Furthermore, an increasing number of birds from the breeding grounds in Svalbard are also

flying via Sweden and Finland to Svalbard in spring. Hence, Finland, Sweden and Russia now qualify as Range States. The development of the migration system, new breeding grounds and use of new staging and wintering grounds is still evolving, and it is uncertain how the situation will look like in 10-20 years.

II. If there are new issues, does the action framework of the Plan need to be changed to address these?

Yes. The spread of the population means that Finland and Sweden (AEWA Contracting Parties) have accepted to become Range States of a revised ISSMP for the Pink-footed Goose. The AEWA Technical Committee and the EGMP Pink-footed Goose Task Force have recommended that the population is treated as one biogeographic population. It has to be decided by the Range States whether or not to manage the population as one or split it into two Management Units (MU) with MU-specific Favourable Reference Values, management objectives and actions. These issues will require a review and adjustment of the action framework.

Further to that, the 8th Session of the Meeting of the Parties to AEWA (September 2022, Budapest, Hungary) adopted a format for AEWA Single and Multi-species Management Plans, which is the first of its kind, and provides a standardised approach to planning management processes. Various amendments to the action framework of the PfG ISSMP are needed to align the plan with this new, standardised approach.

III. Is the intervention logic of the Plan working?

The data for this assessment has been collated based on three main sources: (1) information from the Range States (Norway, Denmark, The Netherlands, Belgium) for the period 2013-2022 (and if possible, going further back in time), supplied by the PfG Task Force members; the data is stored at the EGMP Data Centre and can be made available on request, (2) data from the EGMP Database, which can be accessed via the EGMP website, and (3) data from research projects; data can be made available on request to the authors of the work. Population sizes presented in the report are estimates based on an integrated population model developed for the Svalbard population of the PfG (Johnson et al. 2020). The model is dynamic, being updated annually with new input data.

As is recommended by the guidance accompanying the evaluation report template, the assessment follows the methodology described in the Progress Report on the Implementation of the AEWA Strategic Plan 2019-2027 (see Doc. AEWA/MOP 8.11). The scoring has been performed by the main compiler (J. Madsen) and reviewed by the PfG Task Force. The justifications for the scoring are shown in Table 1, 2 and 3.

Action score	Not assessed	Not implemented / not achieved / no progress / regress	Limited progress	Good progress	Significant progress	Implemented / achieved	Mean result / objective score
0							0
1							0.1 – 1.0
2							1.1 – 2.9
3							3.0 – 3.9
4							4.0 - 4.9
5							5

Figure 3. Scoring of actions (from Doc. AEWA/MOP 8.11)

a. To what extent have actions been implemented?

Ten essential key actions were identified in the ISSMP (Table 1). Using the above Score system (0-5), the average score was 3.6, with the following distribution:

- Score 1: 1 (not implemented)
- Score 2: 1 (limited progress)
- Score 3: 3 (good progress)
- Score 4: 1 (significant progress)
- Score 5: 4 (implemented)

Table 1. Essential key actions in support of the objectives (I-V) defined in the ISSMP (Madsen & Williams 2012), the assessment score and summary of the main achievements

Key action	Score	Summary of achievements
1 Implement an adaptive management framework and modelling concept for the flyway population	5	AHMP framework + predictive models are implemented for annual assessments
2 Maintain a population size of around 60,000, within a range to prevent the population from collapsing or irrupting, respectively. To be agreed and reviewed based on rigorous scientific evaluation and stakeholder consultations as part of the adaptive management process	4	Population has been stabilised as a result of the ISSMP action to increase harvest, but the population is still above target of 60,000 in spring. Annual assessments, reviews and consultations have been performed
3 Optimise hunting regulations and practises to regulate the population size if needed and in range states where hunting is permitted	5	Administrative flexible harvest regulations are in place in DK and NO
4 Prevent establishment of breeding colonies on mainland Norway	1	Action has not been attempted to reduce Norwegian mainland population
5 Ensure sustainable hunting where practised (at present in Norway and Denmark) and following ‘wise use’ principals, whilst ensuring that crippling rates are kept at a minimum level	5	Demonstration projects, training courses, awareness campaigns have led to changes in hunting practises in DK and NO, with consequent

Key action	Score	Summary of achievements
		decrease in disturbance and crippling
6	2	Subsidies paid in NO allow PfG undisturbed foraging in spring; habitat restoration in BE benefits PfG; PfG habitat conservation included in EIAs of energy infrastructure projects in DK
7	3	Evaluation of compensation schemes in place in BE and NL and of a subsidy scheme in NO; monitoring of impact of schemes and damage to crops in NO; consultation meetings between authorities and stakeholders in NO
8	3	Promotion of hunting as a management tool and contribution to achieve acceptance of geese in NO and DK; goose cookbook published in NO; national management plans have not been developed
9	3	Grassland habitat restoration in BE; decreased hunting pressure and disturbance allowing geese to use stubble fields in autumn in NO and DK
10	5	Systematic monitoring has been established in Svalbard under the COAT program funded by NO

b. To what extent have results and objectives been achieved?

Results: A total of 17 results were identified in the ISSMP, given medium, high or essential priority (Table 8 in the ISSMP; Table 2 below). The scoring of achievements of results ranged from score 1-5, with an average of 3.7. Results regarded as essential all scored 5; results regarded as high on average 3.4 and medium on average 2.8.

In addition to the objectives and results defined in the ISSMP, it is noteworthy that the inclusive participatory **Plan Process**, founded on adaptive learning, has prompted close international exchange of knowledge and information among stakeholders, for example among Danish and Norwegian hunters. Furthermore, in terms of monitoring and research, the plan process has initiated new ways of data collection, for example regarding age counts in the autumn (Jensen, Johnson & Madsen 2023), use of banding and resightings as an independent means of estimating population size (Clausen et al. 2019) and optimisation of monitoring (Johnson et al. 2023). During 2013-2023, at least 63 scientific papers were produced related to the Svalbard population of the Pink-footed Goose, most of which were carried out in international collaboration and closely related to the plan process. During the same period, six PhD students and several MSc and BSc students were engaged in studies of the PfG, in most cases co-funded and supervised by international collaborative partners. In several cases, successfully funded scientific applications made reference to the relevance

for the ISSMP. The close interplay between the science and management has been vital for speeding up the adaptive learning and evidence-based decision making in the EGM IWG.

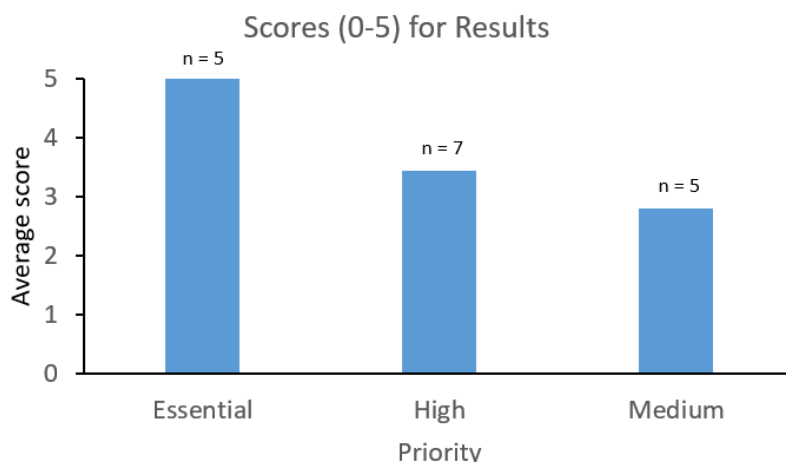


Figure 4. Average scoring of achievements of results according to the defined priorities in the ISSMP (see Table 2 for details).

Table 2. Scoring of achieved results for each of the objectives of the ISSMP (Madsen & Williams 2012).

Objective	Result	Action	Priority	Time-scale	Means of verification	Score
I+II+III+IV+V	An adaptive management framework for the Svalbard population of the Pink-footed Goose has been agreed	PfG International Species Management Plan agreed, along with its goal, 4 objectives and 8 key actions	Essential	Immediate	Acceptance by all Range States and agreement to proceed. Presentation of the PfG ISMP at the AEW A MOP in May 2012. Publication of the PfG ISSMP by AEW A and relevant national authorities in the range states	5

Objective	Result	Action	Priority	Time-scale	Means of verification	Score
I+II+III+IV+V	Implementation of the PfG ISSMP	Establish management structure and group, along with review and feedback system at the international level. Relevant range state authorities (national or regional) will be responsible for implementation and enforcement within each range state, using existing structures/capacity or new structures (as deemed necessary)	Essential	Short	Publication of management structure and composition. In consultation with Range State authorities, regular action and review meetings planned and scheduled. Frequency and ad-hoc meetings to be confirmed as necessary	5
		Predictive modelling tools developed, maintained and results communicated	Essential	Short	Population target confirmed and communicated to relevant national authority in range states	5
II+III+IV	A sustainable and stable target population is maintained. If the threshold target is breached in one or other direction, a contingency review is enacted	Population monitoring. If population size is outside the threshold for a number of consecutive years, the PfG International Working Group agrees to take the necessary action	Essential	Short	Population monitoring data published and data incorporated in predictive models. Contingency plan published, if required	5
III	Harvest management is optimised to maintain sustainable and stable population size	Predictive models to identify harvest impact on the population. Results communicated to relevant national authority in range states. Ensure international and national hunting regulations are agreed and adjusted accordingly	Essential	Short	Publication of international / national hunting regulations	5

Objective	Result	Action	Priority	Time-scale	Means of verification	Score
III		Collection of annual hunting bag statistics within PfG hunting range states. Feedback information into predictive models	High	Short	Publication of hunting bag statistics and data incorporated in predictive models	5
II+III+IV	No breeding by Pink-footed Geese on the mainland of Norway	Development and implementation of program for eradication in Norway, as necessary	Medium	Medium	National/ local management plan published	1
III+V	Hunting is conducted in a sustainable manner	Promote 'wise use' hunting & 'best practices' for the organisation of PfG hunting at national and local levels	High	Short	Publication of guidelines, training programs and local codes of conduct	5
		Ensure that the crippling rate is kept at an agreed minimum within all PfG hunting range states. Maintain monitoring of proportion of population carrying shotgun pellets in tissue	Medium	Short	Monitoring data published and reported to relevant authorities and organisations	5
I	The overall natural migration pattern, behaviour and seasonal distribution by the population are not disturbed by human activities.	Ensure human activities within Range States do not adversely impact seasonal distribution pattern in areas of international importance for PfG, e.g. land use, agricultural practises and hunting. Maintain regular monitoring & observations of geese in Range States outside the breeding grounds. Evaluation of actions on distribution and PfG population size by monitoring and modelling	High	Medium	Publication of arrival and departure dates, seasonal numbers at national / regional levels. Modelling evaluation published	3

Objective	Result	Action	Priority	Time-scale	Means of verification	Score
		Ensure status of protected areas is maintained and enhanced where appropriate	High	Medium	Official documentation of national conservation plans, new information communicated / shared as necessary	3
		Periodic review of relevant international / national policy initiatives likely to impact PfG migration pattern. Results communicated to relevant national authority in range states to support any adaptation action, if required	High	Medium	Publication of relevant findings. Modelling evaluation published	3
II	National agricultural policies and subsidy /compensation schemes and alternative nonconsumptive management actions are evaluated and learning is shared	All range states endeavour to evaluate effects of national policies and subsidy/compensation schemes and alternative nonconsumptive management actions to minimise agricultural conflicts at regular intervals. Monitoring of agricultural conflicts	Medium	Medium	Publication and communication of relevant schemes and evaluation of level of conflict	3
II+V	National/local management plans are produced including development of recreational activities benefitting local communities	Ranges states endeavour to produce national/local management plans, ensuring recreational activities are established and evaluated at local level (economic and cultural value)	Medium	Medium	National / regional management plans published and shared	2

Objective	Result	Action	Priority	Time-scale	Means of verification	Score
I+II	Geese maximise the use of resources in areas where there is no conflict	All range states support and actively facilitate the use of habitats and areas where there is no conflict and restore favourable habitat where desirable Evaluation of actions on distribution and PfG population size by monitoring and modelling	Medium	Medium	National / regional management plans published and shared. Monitoring results and model outputs are published	3
IV	Program to determine impact and extent of tundra degradation	A rigorous and scientific monitoring program is in place. Determine and agree on acceptable levels of tundra degradation	High	Short	Publication of technical guidelines. Annual reporting and publication of data	4
		If extent of tundra degradation is outside acceptable levels, the PfG International Working Group agrees to take the necessary action	High	Medium	Alert Action Plan published, if required	1

Objectives: The five objectives scored an average achievement of 3.7 (range 3-5). Objectives were scored on the basis of 1-3 means objectives (see Table 3). In the boxes shown below (Box 1-5), the main results for each of the five objectives are presented with a short text explaining drivers behind the observed developments and relationships to goose abundances.

Scores (0-5) of achieving objectives

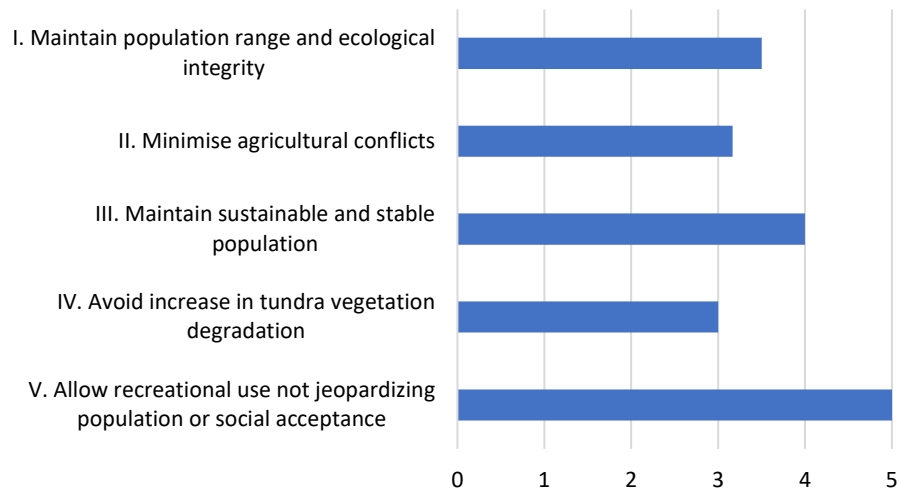


Figure 5. Average scoring of achievements of objectives defined in the ISSMP (see Table 3 for details).

OBJECTIVES	Means objectives level 1	Means objectives level 2	Indicator 1 (quantitative: red; qualitative expert judgement: blue)	Score (objectives level 2)	Score (avg of objectives at level 2)
I. Maintain population range and ecological integrity	I.1 Improve habitat management	Restore grasslands	Area of grassland restored nationally since 2013, with PFG having benefitted	2	3,5
	I.2 Maintain range		Gross area use, numbers and distribution (stopover sites, wintering sites) per country, c. 2013 versus c. 2022 (quantitative for BE and NL, qualitative for DK and NO)	5	
II. Minimise agricultural conflicts	II.1 Optimise compensation and subsidy schemes	Increase information exchange	National compensation paid / subsidy provided for PFG annually versus national goose abundances, 2013-2022	4	3,2
	II.2 Improve recreational values of geese	Increase goose tourism	Number of PFG shot under derogation in February-April, annually, 2013-2022 (Denmark)	3	
	II.3 Increase recreational values of geese	Increase goose tourism	Number of tourist tours and local goose events organised annually per country, including PFG, 2013-2022	2	
III. Maintain sustainable and stable population	III.1 Maintain population at c. 60,000 (spring)	Increase hunting opportunities	National PFG hunting bag per year; number of hunters reporting PFG shot annually, 2013-2022 (Norway, Denmark)	4	
	IV.1 Maintain population of c. 60,000	Restore grasslands	Area of grassland restored nationally since 2013, with PFG having benefitted	2	
	V.1 Minimise crippling of birds due to hunting	Decrease disturbance	Number of hunting days per month versus goose abundances (in discrete local areas)	4	
IV. Avoid increase in tundra vegetation degradation	IV.1 Maintain population of c. 60,000	Adapt and optimise harvest regulations	Spring population estimate (IPM)	4	4
	V.1 Minimise crippling of birds due to hunting	Adapt and optimise harvest practises	Change in tundra degradation extend and impact versus local breeding goose abundances, c. 2006-2022	3	3
V. Allow recreational use not jeopardizing population or social acceptance		Train hunters, communicate	Rate of crippling and crippling ratio (crippling rate over harvest rate) in X-rayed adult and juvenile geese after the hunting season, 2013-2022	5	5
			Number of training courses held and dissemination products prepared annually, 2013-2022	5	

Table 3. Scoring of achievements of objectives based on means objectives defined in the ISSMP and indicators defined at means objectives levels.

Box 1.

Objective I. Maintain population range and ecological integrity

Range outside breeding area (2013-2022)

Country	Autumn	Winter	Spring
Norway	Stable	NA	Increase
Denmark	Increase	Increase	Increase
The Netherlands	Increase (28%)	Increase (28%)	NA
Belgium	Increase	Increase (300 km ² => 500 km ²)	NA
Overall	Increase	Increase	Increase

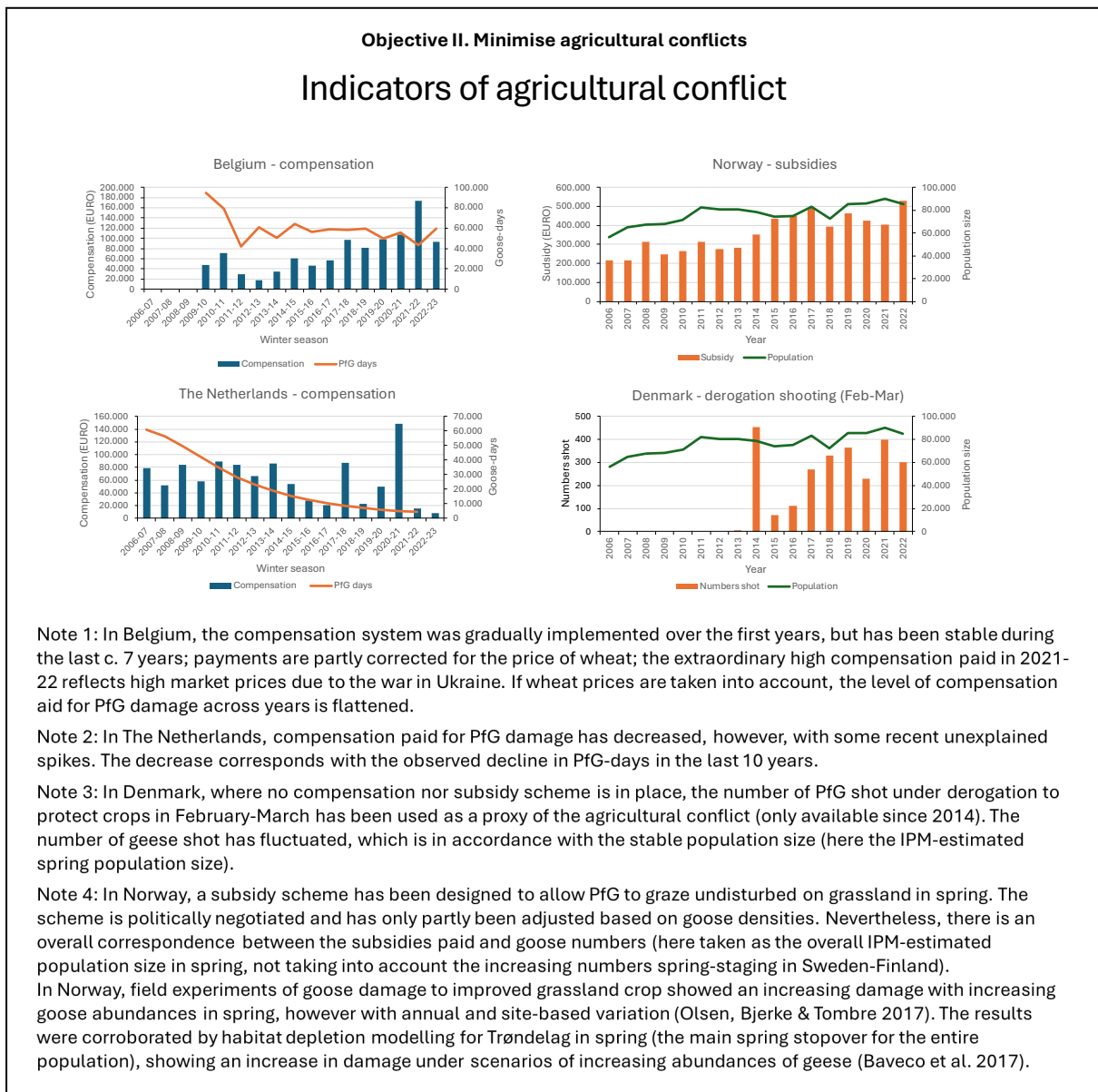
Note 1: One of the drivers of range increment has been the increase in growing of maize, particularly in DK, but also in NL and BE; maize stubble is a habitat intensively exploited by PfG during autumn and winter (Clausen et al. 2018).

Note 2: Intensified shooting in NO and DK has not caused a decline in distribution of geese. In NO it has been shown that better organisation of the hunt in local areas has led to reduced hunting disturbance, elongated stay of geese and more geese shot (Tombre et al. 2022).

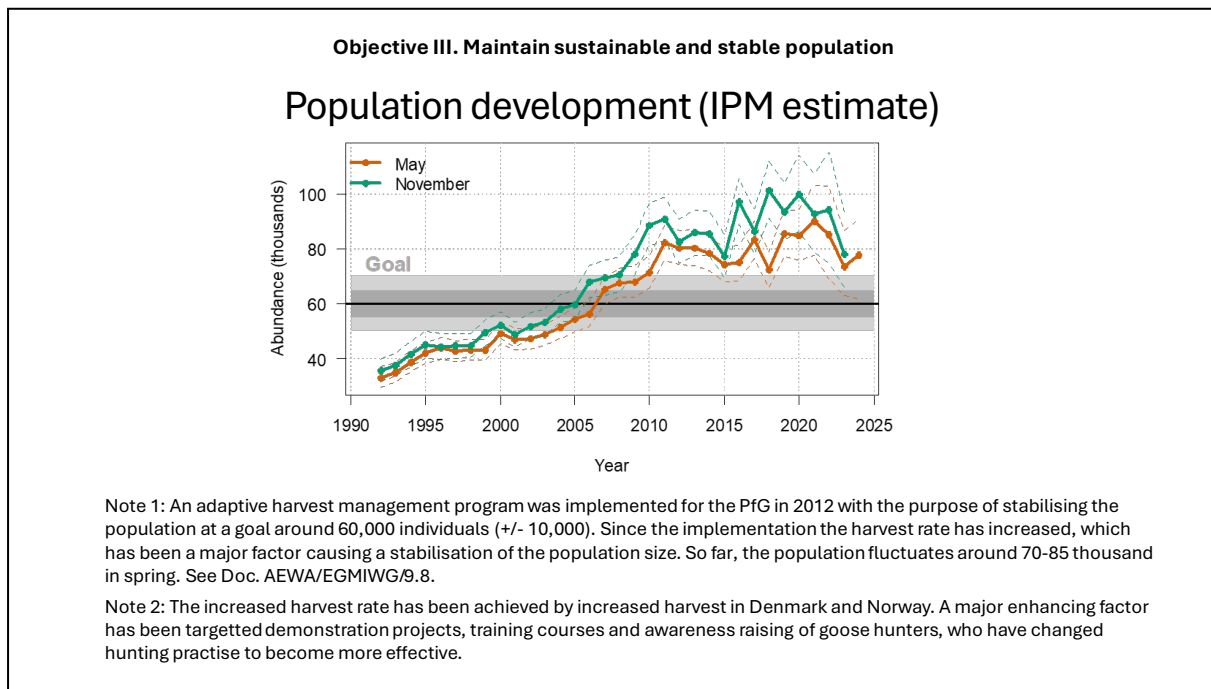
Note 3: PfG have expanded their range outside the breeding season to Sweden and Finland within the last 15-20 years and to Novaya Zemlya for breeding (Madsen et al. 2023).

Note 4: The analysis did not include breeding distribution. It is observed that the breeding range in Svalbard has expanded in recent decades. PfG have also started to breed in Novaya Zemlya, Russia as well (Madsen et al. 2023), and sporadically on mainland NO.

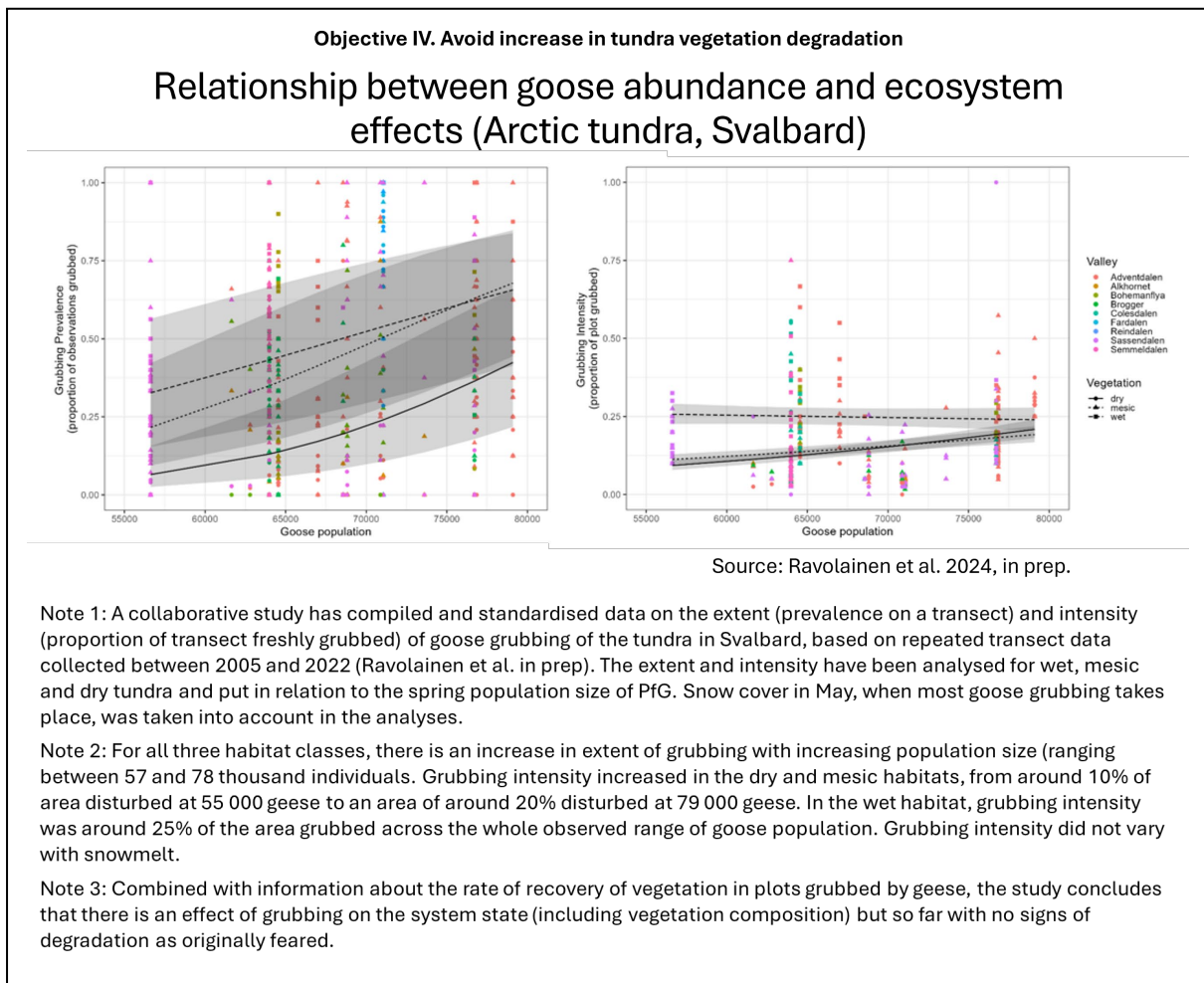
Box 2.



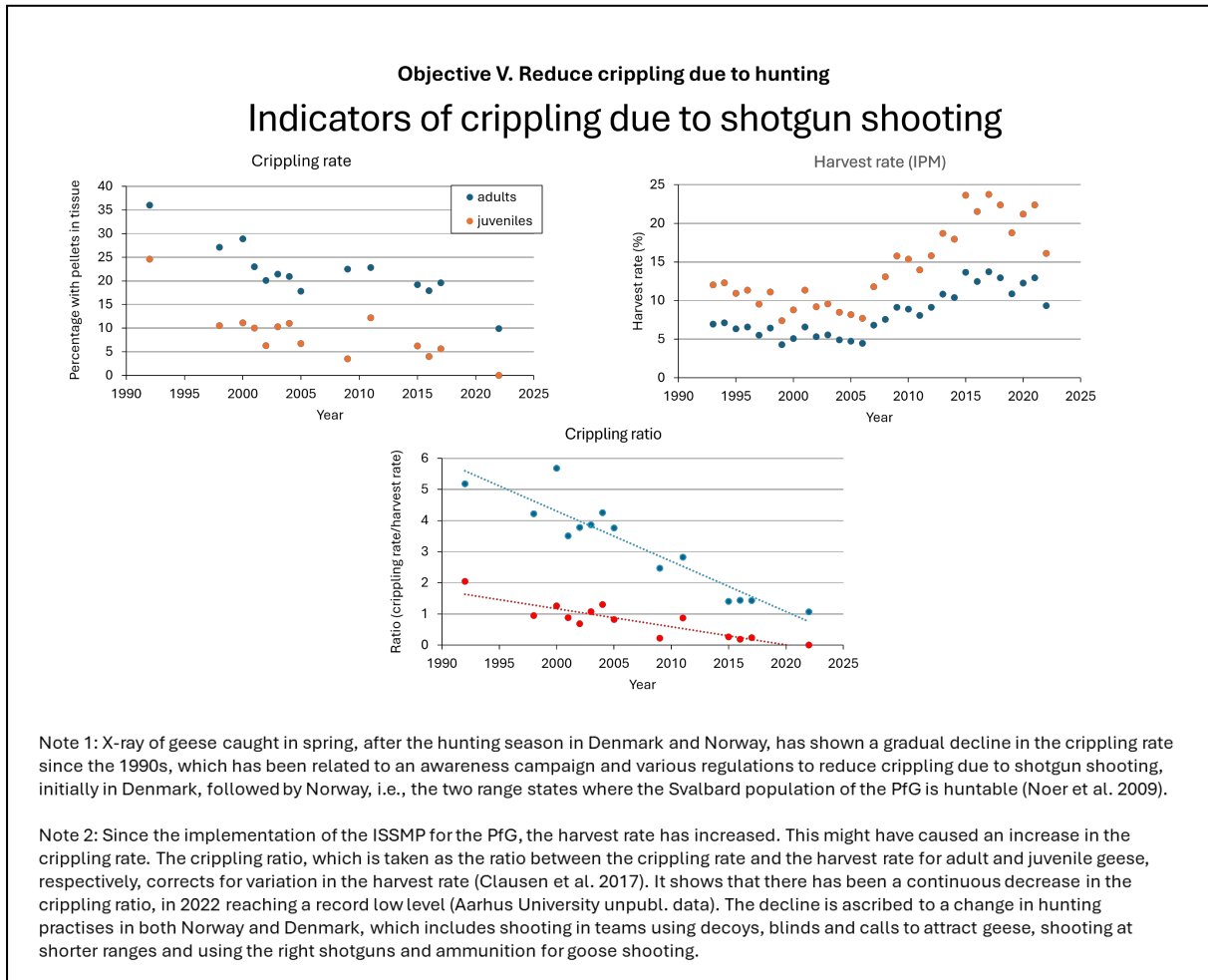
Box 3.



Box 4.



Box 5.



c. What were the main obstacles hindering implementation and achieving defined results and objectives?

Overall, there has been good progress and a relative high degree of implementation in achieving objectives and results. It has been achieved to stabilise the population size, however not at the target of 60,000, but approximately 10-20,000 individuals above (spring population size). To bring the population closer to the target, it would have been necessary to take further action to increase the harvest or alternative actions to reduce adult survival or reproduction. However, it is unclear what is hindering further increase in harvest levels to achieve the optimal quota, and this needs further investigations.

The proposed action to prevent the establishment of breeding colonies of PfG from the mainland in Norway has not been prioritised, but available information suggests that the number of breeding attempts are nevertheless quite small. However, it should be borne in mind, that the agricultural conflict appears to have been reduced, and it does not appear that the grazing ('grubbing') by geese on tundra vegetation has such a negative impact as originally feared, and this stabilisation has reduced the necessity for population control on the mainland of Norway. This calls for a new discussion about the population target.

Restoration of grassland habitat was identified as a key action to minimise agricultural conflicts. This has not been implemented except from seminatural grassland restoration projects in Belgium benefitting PfG. It has not been given priority in other range states, despite the possibilities for restoration of overgrowing seminatural grassland to provide foraging habitats for PfG in both Norway and Denmark. Particularly in Norway, priority has been given to tailor a national subsidy scheme to allow PfG (and Barnacle Geese in North Norway) to forage undisturbed on existing grasslands in spring.

Development of national management plans including promotion of ecotourism has not been given high priority. Public outreach initiatives and dissemination have been taken in Belgium, Denmark and Norway, including film reportages and publishing a goose cookbook, but the more strategic approach to increase ecotourism and outreach initiatives has so far lacked funding.

IV. Conclusion and recommendations

It is recommended to proceed with a full revision including goal, objectives and framework for action.

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